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EXAMINER

CHOW, CHARLES CHIANG

ART UNIT PAPER NUMBER

2685

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7

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/066,072

Applicant(s)

SHAH, PETER JIVAN

Examiner

Charles Chow

Art Unit

2685

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 31-34 is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-23, 25-29 is/are rejected.
- 7) ☒ Claim(s) 6, 24 and 30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 5/6/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Detailed Action

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-2, 4-5, 7-22, 25-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Tolson et al. (GB 2,343,572).

Regarding **claim 1**, Tolson discloses a system for reduction of distortion in a wireless communication circuit having combined signal including a desired and a jammer signal. Because Tolson discloses a GSM receiver system (page 4, third and fourth paragraph), utilizes a feedback subtraction (summer 5/18, figure in cover page, page 5/8, third paragraphs), to remove the unwanted signal from the received signal (title, abstract, Fig. 1-8; page 2, last paragraph to page 3, first paragraph), to reduce the distortion due to unwanted, jamming signal.

Tolson discloses a filter to remove the desired signal and thereby provide a filtered signal representative the jammer signal. Because Tolson discloses the high pass filters 10-11 (figure in cover page; page 5 first paragraph, the unwanted are passed and the desired are rejected).

Tolson discloses an adder circuit to receive the combined signal and the filtered signal to thereby remove the jammer signal. Because Tolson discloses the summer 5/8 (above) to cancel the unwanted signal and the mixer 12 combines the high pass filter 10-11 outputs (figure in cover page) for phase shifter 13 (page 7, first paragraph).

Regarding **claim 2**, Tolson has shown above the RF receiver receiving unwanted signal and

Art Unit: 2685

the desired signal. Tolson teaches the mixer (6) coupled to the adder (summer 5, figure in cover page), to convert RF to lower frequency, with high pass filters 10-11 for reject the desired signal, as shown above, page 5, first paragraph). Tolson teaches the up mixer 12 (as shown above for converting (figure in cover page) the filtered signal to the selected RF (page 5, second and third paragraphs) for subtracting unwanted at summer 5.

Regarding **claim 4**, Tolson has shown above a receiver for receiving rf signal with the desired and unwanted signals. Tolson has shown above a down-mixer (6) for converting rf signal to a selected lower frequency. Tolson has shown above the filters 10-11 operating at selected lower frequency to reject desired signal. Tolson has shown above an up-mixer (12) and adder (summer 5/8) for removing the unwanted jammer signal with generated output signal coupled to the mixer 6 via summer 5.

Regarding **claim 5**, Tolson has shown above, a GSM receiver circuit (figure in cover page, Fig. 1-8) is a quadrature circuit (I,Q baseband outputs 8-9, page 4, third paragraph), a quadrature mixer core (6), the first mixer 3, the second mixer 6, the first and second high pass filters 10-11, the up-mixer 12 for quadrature up conversion. Andersen above has shown above a 90 degree hybrid 21 for combining the converted first and second signals.

Regarding **claim 7**, Tolson teaches the adder (summer 5) has positive and negative inputs (page 5, line 5 from bottom to line 3 from bottom).

Regarding **claim 8**, Tolson teaches the base band I, Q at 8-9 (as shown above) and the high pass filters 10-11 (above).

Regarding **claim 9**, Tolson teaches the analog filter (active filters, page 6 lines 5-6).

Art Unit: 2685

Regarding **claim 10**, Tolson teaches the wireless communication unit has specified operational bandwidth (page 4, fourth paragraph, GSM 25 MHz), and filter has filter bandwidth based on the operational bandwidth (page 6, line 10-12).

Regarding **claim 11**, Tolson has shown above the receiver circuit for canceling of the unwanted signal from the combined received signal. Tolson has shown above the means for filtering to reject desired signal and to select unwanted jammer signal. Tolson has shown above the adder (summer 5/8) for removing the unwanted jammer signal by adding the combined signal and filtered signal.

Regarding **claim 12**, Tolson has shown above a receiver and the received RF of combined signal with desired and unwanted signal. Tolson has shown above the down converted selected low frequency, the means for filtering by 10-11, the upconverting to selected RF by mixer 12, the means for adding at summer 5/8 desired and jammer with filtered signal at summer 5.

Regarding **claim 13**, Tolson has shown above the quadrature communication circuit, the mixer 3/6, the means for filtering, the means for converting to selected rf. Andersen has shown above the combining the converted first and second signal.

Regarding **claim 14**, Tolson has taught above the circuit for canceling unwanted signal for causing distortion in the received signal. Tolson has shown above the receiving of combined desired and unwanted jammer signal, the means for filtering, the means for converting, the means for adding the received rf and filtered signal to remove the unwanted jammer signal.

Regarding **claim 15**, Tolson has shown above the quadrature communication circuit, the quadrature down conversion 6 for a selected lower frequency, the means for filtering, the

Art Unit: 2685

means for converting to selected rf. Andersen has shown above the combining the converted first and second signal.

Regarding **claim 16**, Tolson teaches the adder (summer 5) has positive and negative inputs (page 5, line 5 from bottom to line 3 from bottom).

Regarding **claim 17**, Tolson teaches the base band I, Q at 8-9 (as shown above) and the high pass filters 10-11 (above).

Regarding **claim 18**, Tolson teaches the analog filter (active filters, page 6 lines 5-6).

Regarding **claim 19**, Tolson teaches the wireless communication unit has specified operational bandwidth (page 4, fourth paragraph, GSM 25 MHz), and filter has filter bandwidth based on the operational bandwidth (page 6, line 10-12).

Regarding **claim 20**, Tolson has shown above a method for canceling unwanted signal for reduction of distortion due to unwanted signal for the received combined signal of desired and unwanted jammer signal. Tolson has shown above the filtering to the received combined signal to remove the desired signal, and provide a filtered signal from filters 10-11. Tolson has shown above the adding (at summer 5) of the combined signal and feedback filtered signal via mixer 12, 13, 17, to remove unwanted signal.

Regarding **claim 21**, Tolson has shown above the method for receiving a rf signal at selected rf with combined signal of desired and unwanted. Tolson has shown above the converging the added signal to low frequency at mixer 6 coupled to filters 10-11. Tolson has shown above the converting the filtered signal to selected rf at mixer 12 outputs for sending signal to the adding at summer 5 to add the received desired and unwanted with the filtered converted signal.

Art Unit: 2685

Regarding **claim 22**, Tolson has shown above the method for receiving a rf signal at selected rf with combined signal of desired and unwanted. Tolson has shown above the converging the added signal to low frequency at mixer 6 coupled to filters 10-11. Tolson has shown above the converting the filtered signal to selected rf at mixer 12 outputs for sending signal to the adding at summer 5 to add the received rf and the filtered rf signal to cancel the unwanted jammer signal.

Regarding **claim 25**, Tolson teaches the adder (summer 5) has positive and negative inputs (page 5, line 5 from bottom to line 3 from bottom).

Regarding **claim 26**, Tolson teaches the base band I, Q at 8-9 (as shown above) and the high pass filters 10-11 (above).

Regarding **claim 27**, Tolson teaches the analog filter (active filters, page 6 lines 5-6).

Regarding **claim 28**, Tolson teaches the wireless communication unit has specified operational bandwidth (page 4, fourth paragraph, GSM 25 MHz), and filter has filter bandwidth based on the operational bandwidth (page 6, line 10-12).

Regarding **claim 29**, Tolson has shown above a system for removing the unwanted signal for a GSM receiver. Tolson has shown above the rf stage having input and output, a adder coupled to the mixer, a filter coupled to the mixer, an up mixer (12) coupled to the high pass filter 10 output, and the up mixer output coupled to the second adder input (input of summer 5).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

Art Unit: 2685

such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 3, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tolson in view of Andersen et al. (US 5,442,663).

Regarding **claim 3**, Tolson has taught above the GSM communication receiver is a quadrature circuit (I, Q output 8, 9) and quadrature mixer 6. Tolson also teaches the first and second filter 10, 11 (figure in cover page), the first and second quadrature up mixers in 12. Tolson does not clearly teaches the summer coupled to first and second quadrature up mixer to combine the converted first and second signal portions.

Andersen et al. (also as Andersen in below) teaches the summer coupled to first and second quadrature up mixer to combine the converted first and second signal portions. Because Andersen teaches the 90 degree hybrid 21 receives signals multiplexer 22/23 for canceling interference due to cross polarization, using equalizer 10 (figure in cover page; col. 1, lines 6-10; col. 2, lines 23-33; col. 2, lines 42-63; col. 2, lines 7-13, abstract, figure in cover page), for the claimed summer to combine converted first and second signals. Andersen teaches an improved technique for reducing the interference due to cross polarization using feedback equalizer, to improve the system performance (col. 1, lines 39-40) such that the received information can be easily detected, by canceling the interference. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Tolson above, and to include Andersen's 90 degree hybrid for combining signals from multiplexer 22/23 to reduce interference due to cross polarization, such that the receiver could efficiently detect the received signal.

Art Unit: 2685

Regarding **claim 23**, Tolson teaches the wireless communication GSM receiver is a quadrature circuit for converting rf signal to first and second quadrature components at selected frequency (as shown above). Tolson has shown above the I/Q high pass filters 10-11 and the up conversion mixer 12. Andersen has shown above the combining of the upconverted signals.

Claims Objection

3. Claims 6, 24, 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Because the prior art does not teaches the claimed features for the adder connected to the input or output of a splitter for canceling the jammer signal.

Allowable Subject Mater

4. Claims 31-34 are allowable over the prior art of record.
5. The following is the examiner's statement for the reasons of allowance:

The prior art fails to teach singly, particularly, or in combination, the subject matter for a system for reduction of distortion in wireless communication circuit, having the first input of an adder coupled to the output of the rf stage (in a feed forward loop), the mixer coupled to the rf stage, a filter coupled to the mixer output, and an up mixer coupled to the filter output, with the output of the mixer coupled to the second adder input. The system further claims a four way splitter configuration (Fig. 6), to subtract the jammer signal from the received combined signals of the desired and jammer signals, as shown claims 31-34.

Considerations has been made to the following relevant prior arts:

Art Unit: 2685

Tolson-'572A teaches the feedback subtraction of the unwanted signal from the combined received signal having desired and unwanted signals, for the quadrature I, Q signal communication. Tolson teaches as shown above, the high pass filters 10-11 for rejecting desired signal and the up converting the filtered signal at mixer 12 for applying cancellation of unwanted signal at summer 5. Tolson does not teach the feed forward configuration, having the first input of an adder coupled to the output of the rf stage, the mixer coupled to the rf stage, a filter coupled to the mixer output, and the up mixer coupled to the filter output, with the output of the mixer coupled to the second adder input. Tolson does not teach a system has a four way splitter in the feed forward configuration, to subtract the jammer signal from the received combined signals of the desired and jammer signals.

Andersen-'663 teaches the feedback interference cancellation using equalizer 10. Anderson Andersen teaches the 90 degree hybrid for combining multiplier 22-23 output. Andersen does not teach the above claimed features in claims 31-34.

Schwegman (US 5,276,450) teaches the anti-jam method and apparatus, having power divider 25 (abstract, figure in cover page, summary of invention). Schwegman does not teach the above claimed features in claims 31-34.

Bickley et al. (US 4,739,518) teaches the suppression of the interference in a receiver having the signal divider 24 and the subtractor 30 (abstract, figure in cover page, summary of the invention). Bickley does not teach the above claimed features in claims 31-34.

Takada (US 2002/0155,812A1) teaches the canceling of the interference jamming in a digital radio transmission (abstract, figure in cover page). The receiver has signal distributor 126 and summer 127 (abstract, figure in cover page, summary of invention).

Art Unit: 2685

Tsujimoto (US 5,982,825) teaches the removing of the inband interference using feedback configuration having mode 7, filter 8, adder 3 (abstract, figure in cover page, summary of invention).

The prior arts are not disclosing the claimed features, singly, or in a reasonable combinations, as shown above.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee, and to avoid processing delays, should preferably accompany the issue fee. Such submission should be clearly labeled "comments on statement of reasons for allowance".

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
 - A. US 4,320,523, March 1982, Horikawa et al. teaches the removing of the interference in a reception system, using feedback technique with adder 3, filter 8 (abstract, figure in cover page).
 - B. US 5,950,110, September 1999, Hendrickson teaches the jamming detection using the near-term noise, the jamming threshold, and the long-term noise level (abstract, Fig. 1-8, summary of invention).
7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Chow whose telephone number is (703)-306-5615.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor,

Art Unit: 2685

Edward Urban, can be reached at (703)-305-4385.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to: (703) 872-9306 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,

Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.



Charles Chow

October 16, 2003.



EDWARD F. URBAN
SUPERVISORY PATENT EXAMINER
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